

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/33142

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C12N 1/20, 15/00; C12P 19/62

US CL : 435/252.3, 76, 320.1

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 435/252.3, 76, 320.1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CAPLUS - search terms = albicidin, gene, xanthomonas, albilineans, biosynthesis, pathway, cluster

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
T	ROYER et al. Albicidin Pathotoxin Produced by Xanthomonas albilineans Is Encoded by Three Large PKS and NRPS Genes Present in a Gene Cluster Also Containing Several Putative Modifying, Regulatory, and Resistance Genes. Mol Plant Microbe Interact. 2004, Vol. 24. No. 4, pages 256-260, in particular the XALB1 that is taught is SEQ ID NO:1 and the XALB2 that is taught is SEQ ID NO:2.	1-4, 6, 7, and 30
A	HUANG et al. Albicidin antibiotic and phytotoxin biosynthesis in Xanthomonas albilineans requires a phosphopantetheinyl transferase gene. Gene 2000, Vol. 258, pages 193-199, in particular the xabA that is taught is almost identical to albXXII of XALB2.	1-4, 6, 7, and 30
A	HUANG et al. Analysis of the genes flanking xabB: a methyltransferase gene is involved in albicidin biosynthesis in Xanthomonas albilineans. Gene 2000, Vol. 255, pages 327-333, in particular the xabC that is taught is identical to albII of XALB1.	
A	HUANG et al. A multifunctional polyketide-peptide synthetase essential for albicidin biosynthesis in Xanthomonas albilineans. Microbiology. 2001, Vol. 147, pages 631-642, in particular the XabB that is taught is very similar to albI of XALB1.	1-4, 6, 7, and 30



Further documents are listed in the continuation of Box C.



See patent family annex.

Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"B" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

11 April 2005 (11.04.2005)

Date of mailing of the international search report

14 JUL 2005

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C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT.

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	ROTT et al. At Least Two Separate Gene Clusters Are Involved in Albicidin production by <i>Xanthomonas albilineans</i> . J. Bacteriol. August 1996, Vol. 178, No. 15, pages 4590-4596.	1-4, 6, 7, and 30
A	Database Genbank, Accession Number AF403709, BOSTOCK et al. <i>Xanthomonas albilineans</i> AlbF (albF) gene, complete cds. (gi:15553446), 2001.	1-4, 6, 7, and 30
A	WALL et al. Genes for albicidin biosynthesis and resistance span at least 69 kb in the genome of <i>Xanthomonas albilineans</i> . Letters in Applied Microbiology. 1997, Vol. 24, pages 256-260.	1-4, 6, 7, and 30
A	WO 02/024736 A1 (THE UNIVERSITY OF QUEENSLAND) 28 March 2002 (28.03.2002).	1-4, 6, 7, and 30

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Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
 2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
 3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
 4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-4,6,7 and 30
- Remark on Protest ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

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Continuation of Item 4 of the first sheet:

The title is too long and not descriptive as per PCT Rule 4.3. The new title is as follows:
Complete Biosynthetic Gene Set for Biosynthesis of Albicidin, Resistance Genes, and Uses Thereof

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group 1, claim(s) 1-4, 6-7 and 30, drawn to genetic constructs comprising SEQ ID NOs:1, 2 **AND** 3, related products (transformed host cells), and methods of making antibiotics using said constructs.

Groups 2-26, claim(s) 5-15 and 28-29, drawn to genetic constructs comprising SEQ ID NOs:1-25, respectively, or related sequences (percent identity, fragments, variants, encoding language etc.), related recombinant cells, and methods of making encoded proteins.

Groups 27-51, claim(s) 16-18, drawn to methods of making polyketides using at least SEQ ID NOs:1-25, respectively, or related sequences as noted above.

Groups 52-73, claim(s) 19, drawn to polypeptides related to SEQ ID NOs: 26-47, respectively.

Group 74, claim(s) 20-22 and 24, drawn to an antibiotic, an "albicidin-like product".

Groups 75-99, claim(s) 23, drawn to methods of making antibiotics by altering the expression of at least SEQ ID NOs:1-25, respectively, or related sequences as noted above.

Groups 100-125, claim(s) 25, drawn to methods of protecting a plant using an agent that blocks any one of SEQ ID NOs:1-25 (albicidin-biosynthetic gene's), respectively, expression.

Groups 126-150, claim(s) 26, drawn to methods of screening for an agent that blocks albicidin expression using a host cell that expresses at least one of SEQ ID NOs: 1-25, respectively.

Groups 151-175, claim(s) 27, drawn to methods of protecting a plant by expressing a resistance gene selected from at least SEQ ID NOs:1-25, respectively, or related sequences as noted above.

The inventions listed as Groups 1-175 do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

In Group 1, Claim 1 requires all three sequences in genetic constructs: that is SEQ ID NO:1, SEQ ID NO:2, **and** SEQ ID NO:3. This combination of *exact* sequences is considered above the prior art and, therefore, can be considered the special technical feature of Group 1. Groups 2-26, drawn to related sequences, portions thereof, etc., do not share the special technical feature that is exactly at least SEQ ID NOs: 1, 2, **and** 3. This is particularly notable considering the discussion of the prior art in paragraphs 0006-0009, which describes how SEQ ID NO:2 (the phosphopantetheinyl transferase) is known in the prior art and how a large portion of SEQ ID NO:1 is also known in the prior art.

In Groups 2-26, Claims 5-15 and 28-29 are also drawn to polynucleotides and related products. However, since none of Claims 5-15 and 28-29 require all three SEQ ID NOs: 1, 2, **and** 3, said claims do not share the special technical feature of Group 1. Thus, Claims 5-15 and 28-29 lack unity of invention with Group 1. Moreover, Groups 2-26 lack a corresponding technical feature with each other due to their distinct sequences and, thus, have been grouped separately according to their different technical features.

In Groups 27-51, Claims 16-18 are drawn to methods of using sequences related to, but not requiring all of, the special technical feature of Group 1. Thus, said methods do not use the special technical feature of Group 1 and, thus, lack unity of invention with Group 1. Additionally, a first method of using the special technical feature of Group 1, Claim 6, has already been grouped with the special technical feature; grouping of only a first method of making/using is required according to PCT Rule 13. Moreover, Groups 27-51 lack a

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corresponding technical feature with each other due to their using distinct sequences in the claimed methods and, thus, have been grouped separately according to their different technical features..

For Groups 52-73, while Claim 19 (polypeptides) items (a) and (b) share the special technical feature of Group 1 by being encoded by the gene cluster of SEQ ID NOs: 1, 2, *and* 3, Claim 19 items (c) and (d) include breadth of scope (fragment, % homology language) that does not correlate to the special technical feature of Group 1. Thus, Claim 19 lacks unity of invention with Group 1. Moreover, Groups 52-73 lack a corresponding technical feature with each other due to their distinct sequences and, thus, have been grouped separately according to their different technical features.

While the antibiotics of Group 74 (Claims 20-22 and 24) can be made using the product of Group 1, that is the special technical feature that is SEQ ID NOs: 1, 2, *and* 3, said feature is not shared with the antibiotics which are wholly different structural and functional compounds from polynucleotides, genetic constructs, and/or transformed host cells. Thus, Group 74 lacks unity of invention with Group 1.

The methods of Groups 75-175 may use or affect all or a portion of the special technical feature of Group 1, that is SEQ ID NOs: 1, 2, and 3; however, use of all of SEQ ID NOs: 1, 2, and 3 is not required in any of the claimed methods. Thus, Groups 75-175 are not required to make or use the special technical feature of Group 1. Thus, Groups 75-102 lack unity of invention with Group 1. Moreover, a first method of use has already been included in Group 1 as required by PCT Rule 13 and Groups 75-175 can be considered additional methods of making or using the special technical feature not required to be combined with the special technical feature.